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Chapter 4

Attachment representations in middle childhood: A validation study

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Abstract

There is an ample need for attachment measures in middle childhood, as well as for the validation of measures of attachment representation in this developmental phase. The present study tested the validity of the Attachment Story Completion Task (ASCT, Verschueren & Marcoen, 1994a, 1994b) in a longitudinal study of 94 girls (age 18-89 months). Concerning convergent validity, we found no association between attachment quality as measured with the ASCT and attachment security as observed in a separation-reunion procedure. Construct validity of the ASCT was examined using physiological assessments. Although children experienced more stress during the attachment related stories than during the control stories as indicated by an increase in heart rate, no difference in reactivity was found between secure and insecure children. Stability of attachment security (18-89 months) turned out to be low, and secure attachment representations were not related to more sensitive parenting. Our study failed to find support for the validity of the ASCT in middle childhood in a homogeneous upper-middle class sample of girls and their mothers.

Introduction

Attachment theory provides a framework for the development of attachment across the complete lifespan. Research to test the various facets of attachment theory has focused mainly on infancy, early childhood, adolescence, and adulthood. Over the years, the field has developed well validated measurement techniques to assess attachment in infancy and early childhood (e.g. the Strange Situation Procedure, Ainsworth, Blehar, Waters, & Wall, 1978, and the Attachment Q-Sort, Vaughn & Waters, 1990, see Van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004) and in late adolescence and adulthood (the Adult Attachment Interview, George, Kaplan, & Main, 1996). These instruments are now widely used in attachment research. A relatively 'forgotten' age group in research developing measures for attachment is middle childhood (Mayselless, 2005). Consequently, attachment studies conducted in this period do not use standard measurement techniques that have been validated as well as measures used in other stages of development (Kerns, Schlegelmilch, Morgan, & Abraham, 2005). Because of the eminent importance of the use of well validated measures in attachment research, this study aims at contributing to the validation of a measure used in middle childhood, the Attachment Story Completion Task (ASCT; Verschueren & Marcoen, 1994a, 1994b).

Attachment in middle childhood may be described both at the behavioral and at the representational level. At the behavioral level, the attachment figure still serves, as in infancy, as a secure base to foster exploration and play, and as a safe haven in times of distress (Bowlby, 1973). In addition, children have developed a representation of attachment, an internal working model, which is formed by the experiences with the attachment figure during and beyond infancy (Bretherton & Munholland, 1999).

Measuring the quality of attachment during the early stage of middle childhood at the behavioral level is usually done using observations of the child's separation from and reunion with the attachment figure, e.g. the Cassidy-Marvin System (Cassidy, Marvin, & MacArthur Working Group on Attachment, 1992), or the Main-Cassidy System (Main & Cassidy, 1988). Quality of attachment at the level of representation can be assessed with procedures in which the actual attachment figure is not present, using children's responses to pictured situations, e.g. the Separation Anxiety Test (Slough & Greenberg, 1990), or to doll-play narratives, e.g. the Attachment Story Completion Task (Verschueren & Marcoen, 1994a, 1994b). The current study focuses on doll-play narratives (for a review of other measures of attachment in middle childhood, see Solomon & George, 1999).

Doll-play narratives make use of children's growing verbal ability by asking the child to complete standardized attachment-related story beginnings, acted out by an experimenter manipulating small family figures. These story-endings form the basis for assessing the quality of the attachment representation of the child (Bretherton, Ridgeway, & Cassidy, 1990). Although the general format is the same, the various doll-play methods differ in several respects: the number of attachment-related stories, the range of scenarios presented by the stories, assessing representation of a specific or more general attachment relationship, and the coding system (for an overview, see Stevenson-Hinde & Verschueren, 2002).

Research on the validity of doll-play narratives mainly focuses on convergent validity. Evidence has been gathered in studies measuring the concordance between concurrently assessed doll-play narratives and separation-reunion procedures. Cassidy (1988) found that 6-year-old children classified as secure in the separation-reunion procedure tended to be classified as secure in the doll-play procedure. The same results were found for children classified as insecure, even to the extent that the children were classified into the same category of insecurity across procedures. Bretherton et al. (1990) showed the same results with 3-year-olds, although no consistency across procedures was found for the various types of insecurity. Solomon, George, and De Jong (1995) also found a satisfactory overall agreement in 6-year-old children between doll-play classifications and classifications based on reunion behavior, except for the insecure-avoidant children.

Another form of validity, construct validity, "is evaluated by investigating what psychological qualities a test measures" (American Psychological Association, as cited in Cronbach, 1971, p. 444). It refers to whether doll-play narratives actually measure the attachment representation they claim to measure (Hair, Anderson, Tatham, & Black, 1995). One way to examine the construct validity is through psychophysiological assessments. Psychophysiological studies to examine the presence or absence of a specific emotional state during attachment eliciting tasks have been conducted with infants (Fox & Card, 1999). Sroufe and Waters (1977) were among the first to record heart rate during the Strange Situation. They found that all children showed an increased heart rate during separation, which remained elevated during reunion. Differences were reported in recovery time; children with secure attachments recovered faster than children with insecure attachments. Subsequent studies by Donovan and Leavitt (1985), and Spangler and Grossmann (1993), however, did not show any differences between securely and insecurely attached infants in heart rate change during the reunion episodes of the Strange Situation.

When attempting to validate a measurement technique used in attachment research, four core theoretical hypotheses may also be taken into account; (1) moderate stability over time of attachment security is expected; (2) sensitive parenting and attachment security should be positively related; (3) there should be a predictive relationship between attachment security and other aspects of socio-emotional development; (4) assessment of attachment security might be done in a similar way across cultures and attachment figures (Solomon & George, 1999). Unfortunately, there are only a few studies that have addressed one or more of these four core theoretical hypotheses regarding the doll-play narratives.

Evidence for the stability of doll-play assessments of attachment across time was found in two longitudinal studies. Bretherton, Ridgeway, and Cassidy (1990) showed that attachment security scores as assessed with doll-play narratives at 37 months were positively associated with continuous scores for security in the Strange Situation at 18 months, and with security scores based on the Attachment Q-sort at 25 months. Gloger-Tippelt, Gomille, Koenig and Vetter (2002) also found continuity between attachment classification in infancy, measured with the Strange Situation Procedure, and attachment at age six, measured with a doll-play story completion procedure.

Support for the expected association between sensitive parenting and attachment security is only available for self-report measures of sensitive parenting, not for observational measures (Stevenson-Hinde & Verschueren, 2002). Mother's report of marital satisfaction, family adaptability and family cohesion was positively related to attachment security scores assessed with doll-play narratives in 3-year-olds (Bretherton et al., 1990). Verschueren (1996) found a positive association between kindergartners' attachment representation and self-reported parental encouragement of the child's independence, but no association with self-reported parental warmth.

There is also some support for predictive relations between attachment security and other important aspects of development. Children (aged five to seven) with secure representations of attachment towards mother and/or father as assessed with the ASCT scored higher on peer social competence, school adjustment, and lower on anxious/withdrawn behavior than children with insecure representations of attachment (Verschueren & Marcoen, 1999). Also, children's self-reported and teacher-reported level of self-esteem was positively related to their attachment representation (Cassidy, 1988; Oppenheim, 1997).

The last validity issue concerns the claim that assessment of attachment security may show similar associations across cultures and attachment figures. To support the first part of the hypothesis, the universal nature of attachment, studies among different societies, ethnic groups and social classes should be done showing the validity of the measures used (Solomon & George, 1999). In infancy, the Strange Situation Procedure has been widely used in attachment studies across different cultures (for a review, see Van IJzendoorn & Sagi, 1999, 2001). However, the few studies conducted with children in middle childhood used predominantly white, middle-class samples (e.g. Bretherton et al., 1990; Cassidy, 1988; Solomon et al., 1995). There is not enough diversity among cultures and ethnic groups included in the studies to address this issue in any definite way. The same is true for the suggestion that assessment of attachment should be the same across different attachment figures. In middle childhood, most studies focus on the child-mother attachment representation, and only a few studies also assessed the child-father attachment representation (Page & Bretherton, 2001; Verschueren & Marcoen, 1999).

We may conclude, therefore, that research on the validity of doll-play narratives in middle childhood still is in its infancy. Given the fact that there are several different procedures used in doll-play narratives, and validation is only partly available for any of the measures, a systematic approach is needed to further extend our knowledge about the validity of measuring attachment via doll-play narratives in middle childhood (Stevenson-Hinde & Verschueren, 2002). This study focuses on the validity of one of the doll-play measures; the Attachment Story Completion Task (Verschueren & Marcoen, 1994a, 1994b), for which some important findings regarding the predictive validity are already available (Verschueren & Marcoen, 1999).

Our study has four aims. The first aim is to assess the convergent validity of the ASCT by comparing its assessment of attachment security with that of a concurrent observational measure of attachment. Second, we examine the construct validity of the ASCT, measuring physiological indices of stress: electrodermal activity and heart rate variability. We expect that children with secure and insecure attachment representations differ in physiological stress responses to the ASCT-stories, particularly to the attachment-related stories. Our third aim is to examine the stability of attachment security over time. Our last aim is to test the relation between sensitive parenting and attachment security as assessed with the ASCT.

Method

Participants

Mothers with a firstborn female toddler of fifteen months of age were recruited using town hall records in The Netherlands. They were invited to participate in a study on mother-child interaction and the development of empathy and compliance in young children. We received 240 valid replies of which 151 (63%) were positive. Town hall policy prevented us from collecting data on negative responses. Twenty mother-child dyads were seen in pilot sessions, in order to refine instruments and instructions. One hundred and thirty-one mother-child dyads participated in the data collection at 18 months.

Seventy-two percent of the mother-child dyads that participated in the data collection at 18 months also participated six years later. Of the twenty mother-child dyads who participated in the refinement of instruments and instructions at 18 months, sixteen were seen again in pilot sessions at 89 months. Thirty-four of the 131 dyads at 18 months did not participate at 89 months for personal reasons; three dyads did not participate because they moved abroad. They did not differ from participating dyads on any of the background variables on 18 months. At the time of measurement at 89 months, the participating mothers ranged in age from 28 to 48 years ($M = 38.7$, $SD = 3.2$). Eighty-eight percent of the participating girls lived with their two biological parents. Thirteen percent of the girls had no sibling, sixty-four percent had one (younger) sibling, and twenty-three percent had two or more (younger) siblings. Eighty-six percent of the mothers worked outside the home for on average 23 hours per week ($M = 23.3$, $SD = 6.7$, $Min = 6$, $Max = 38$). Their mean socio-economic status based on both occupation and education was 3.9 ($SD = 1.7$, $Min = 1.5$, $Max = 6.0$) on a scale ranging from 1 to 6, indicating a predominantly middle-class and upper middle-class sample. Mean age of the child at the time of first measurement was 18 months ($SD = 0.8$, $Min = 17$, $Max = 21$) and their mean age at the time of the follow-up home measurements was 89 months ($SD = 5.9$, $Min = 78$, $Max = 101$).

Procedure

At 18 months, mother and child were invited to the institute. The Strange Situation procedure was administered to assess the quality of the infant-mother attachment relationship, and several other observations that are not discussed here. The lab session lasted about 90 minutes. (For more detailed information about the procedure at 18 months, see Van der Mark, Van IJzendoorn, & Bakermans-Kranenburg, 2002.)

At 89 months, a different female experimenter visited the children at home. The session started with the Peabody Picture Vocabulary Test (PPVT). Afterwards, the child's attachment representation was assessed using the Attachment Story Completion Task. The equipment for measuring the child's physiological reactions was attached before the administration of the PPVT, in the presence of the mother in order to minimize the child's distress. For the remainder of the session, the mother left the room so the child would feel free to answer the interviewer's attachment-related questions. The session was videotaped with a video camcorder at a fixed location.

Within two weeks after the home visit, mother and child were invited to the institute. Halfway through the visit mother and child were separated for about 30 minutes, during which the child performed various structured tasks with the experimenter. Mother and child were then reunited; the reunion was used to assess the quality of the attachment relationship. Next, maternal sensitive structuring was observed in a 10-minute puzzle task. Home visits and lab sessions lasted about 90 minutes each.

All procedures were videotaped, and coding was done from videotape. Different coders coded the variables, in order to guarantee their being unaware of other characteristics of the dyads.

Measures

Attachment

Quality of attachment was assessed at 18 months with the Strange Situation Procedure (SSP, Ainsworth et al., 1978), a laboratory procedure with three mildly stressful components: the confrontation of the child with a strange environment, an unfamiliar adult, and two short separations from the mother. The child's pattern of attachment behavior was classified as insecure-avoidant (A), secure (B), or insecure-resistant (C). Infants classified as disorganized (D; Main & Solomon, 1990) were forced into an alternative classification as A, B, or C. Insecure-avoidant children shift their attention away from their distress and from the mother, and seem to remain focused on exploration. Insecure-resistant children display attachment behavior and seek proximity, but at the same time resist contact with the mother, and do little exploring. Secure children strike the balance between exploration and attachment behavior: they seek contact with the parent when distressed, but are readily reassured and resume exploration.

Two coders (the second and third author) coded the Strange Situation Procedures. One of the coders was trained in Minneapolis (by Brian Vaughn) and in Berkeley (by

Mary Main), and both coders received advanced training in Leiden (by Mary Main). Reliability between the coders on 20 cases from another dataset was adequate, with 100% agreement on the A, B and C distinction (for more detailed information, see Van der Mark, Bakermans-Kranenburg, & Van IJzendoorn, 2002).

In order to compute a continuous score for attachment security, we used the simplified Richters, Waters and Vaughn (1988) algorithm (Van IJzendoorn & Kroonenberg, 1990). These continuous attachment security scores were computed on the basis of the interactive SSP scale scores for proximity seeking, contact maintaining, resistance, and avoidance. The intercoder reliability on 14 cases was adequate, intraclass correlation .76 (single measure, absolute agreement).

At 89 months, attachment was measured both during the lab visit (observation) and as part of the home visit (attachment story completion task). During the lab visit, the Main-Cassidy system for separation and reunion (Main & Cassidy, 1988) was used. After a separation from the mother of about 30 minutes, a reunion episode of three minutes was videotaped. Patterns of attachment were coded based on communication, gaze, affect, body positioning, play, and control, and classified as insecure-avoidant (A), secure (B), or insecure-resistant (C). Infants classified as controlling or disorganized received an alternative classification as A, B, or C. At this age, insecure-avoidant children keep a comfortable distance from the parent and show minimal responses. Insecure-resistant children are preoccupied with the relationship with the mother, and show immature and/or angry behavior. Secure children have calm and comfortable interaction with the mother and give an update to the mother when she returns (Cassidy et al., 1992; Stevenson-Hinde & Verschueren, 2002). The same two coders who coded the Strange Situation Procedure at 18 months coded the tapes at 89 months, never coding the same child at both 18 and 89 months. Reliability between the coders on 15 cases was adequate, with 80% agreement on the A, B and C distinction ($\kappa = .67$). A continuous score on a 9-point scale for security was also assigned. The intercoder reliability between the two coders on 15 cases was sufficient, intraclass correlation .78 (single measure, absolute agreement).

During the home visit, attachment representation was measured using the attachment story completion task (ASCT; Verschueren & Marcoen, 1994a; based on Cassidy, 1986, and Bretherton et al., 1990). Each child was asked to complete five attachment-related story beginnings using a doll family. The topics of the stories are the child's bicycle being stolen by an unfamiliar child; giving a present to the attachment figure; saying "I'm sorry"; crying because the child has quarreled with another child at school;

and screaming that there is a monster in the bedroom (for more detailed information see Verschueren, Marcoen, & Schoefs, 1996). Because we were interested in the attachment representation of the child-mother relationship, the stories were administered using a child and mother doll.

Each of the five stories was classified into one of four groups and was rated on a five-point scale for attachment security. If the child completed the story with little hesitation and showed open and positive interactions with the attachment figure, the story was classified as "secure" and received a score of 4 or 5. If the child was reluctant to complete the story or the interactions with the attachment figure were minimal, the story received the classification "insecure-avoidant" and received a score of 1 or 2. If the child showed negative, hostile, bizarre interactions with the attachment figure, which could be alternated with brief episodes of harmonious interactions, the story was classified as "insecure-bizarre/ambivalent" and received a score of 1 or 2. If the child did not show a clearly secure or clearly insecure story, the classification of "secure/insecure" and a score of 3 was used. Detailed criteria for classification and scoring are available for every one of the five stories (Verschueren & Marcoen, 1994a). Each child received an overall attachment classification, either secure, avoidant, or bizarre/ambivalent, on the basis of the classification for the five stories. A global attachment security score was given by summing the scores on the five stories. Coders, who were blind to all other information of the child, coded the stories from verbatim transcripts made of the videotaped session. Each story was coded independently, without knowing any information about the other stories of the child. Correlations between the five stories varied between .00 and .29, with a reliability of .48. Principal components analyses showed that the five stories could be forced on one underlying factor (factor loadings .43-.75).

The stories were coded by five coders who received reliability training on stories coded by Verschueren. Overall agreement for the global category on 40 cases varied from 80 to 83% (mean agreement 82%), kappa .70. For the global attachment security score the average intraclass intercoder reliability for five coders on 40 cases was .91 (range .89 to .97). In order to reduce the possibility of an incorrect classification, all stories were coded twice by different coders. In cases of disagreement, a third coder decided.

To avoid misclassification because of a poor test attitude and/or insecurity in the relation to the examiner (instead of the attachment figure), three control stories were included among the attachment stories (Verschueren & Marcoen, 1994b). They referred to interactions with a peer (playing a game; sharing cookies; painting a picture

in the classroom), instead of interactions with the attachment figure. If a child refused to complete the control stories, he was judged as “unclassifiable” for the attachment stories and would be excluded from the analyses. This was not the case for any of the children participating in this study.

Physiological measures

At 89 months, electrodermal activity (EDA), heart rate (HR), and heart rate variability (HRV) were measured to assess the physiological reactions of the children during the home visit. Two devices were used of an ambulatory system called the Ambulatory Monitoring System (AMS; version 36 and 46, Vrije Universiteit, Department of Psychophysiology, Amsterdam, NL; e.g., Christie & Friedman, 2004); one to measure EDA, and one to measure HR and HRV. Recording of EDA was done with two small Ag/AgCl skin conductance level (SCL) electrodes on the volar surfaces of the medial phalanges of the child’s right hand. The SCL electrodes were applied with a small amount of Unibase paste (Fowles et al., 1981) and taped onto the fore- and middle finger with Leukoplast. Level of skin conductance was sampled and written to the AMS for each 500-millisecond period.

For the recording of the HR and HRV, three disposable electrocardiogram (ECG) electrodes were placed on the child’s chest in a triangular arrangement. The AMS-device was programmed to continuously record all inter-beat-intervals. From raw inter-beat-intervals, every 10 seconds an average HR and RMSSD; the Root Mean of the Squared Successive Differences are computed, which are used to index heart rate variability (Groot, De Geus, & De Vries, 1998; Task Force of the European Society of Cardiology the North American Society of Pacing Electrophysiology, 1996).

The physiological reactions were synchronized to the different stories of the Attachment Story Completion Task using an Event Marker button on the AMS-device together with the recording of time. The experimenter pushed the button at the beginning of each story, leaving a marker that allowed for accurately labeling each story. Due to failure of equipment, mostly caused by broken wires, the physiological measures were available for 74 children (21% attrition). Recommendations for excluding artificial readings and outliers from ambulatory EDA-, HR- and HRV-records for means, minima and maxima were followed (Groot et al., 1998; E.J.C. de Geus, personal communication, May 15, 2006). Two children showed unacceptable physiological values on RMSSD on three intervals. These values were replaced with the next acceptable score for that person. On the basis of standardized scores, three outliers were found ($z > 3.29$) and changed into the next most extreme score

(Tabachnick & Fidell, 2001). Previous research shows that the AMS is a valid instrument for detecting physiological activity (Klaver, De Geus & De Vries, 1994).

In order to examine the differences in physiological reactivity between the attachment and control stories during the Attachment Story Completion Task, an overall score was made for each of the physiological measures on the attachment stories and the control stories by summing the means of the physiological measures and divide these by the number of valid stories. This resulted in an overall score for attachment stories and an overall score for control stories, for mean electrodermal reactivity, mean heart rate, and mean heart rate variability.

Maternal sensitivity

At 89 months, maternal sensitivity was observed during the lab visit when mother and child were asked to complete a puzzle that was too difficult for the children. Mothers were told that they were allowed to help their child as they would normally do. The 10-minute episode was coded using the revised Erickson scales for Supportive presence, Clarity of instruction, and Sensitivity and Timing in instruction (Egeland, Erickson, Clemenhagen-Moon, Hiester, & Korfmacher, 1990). These scales were adapted for use in middle childhood by Stams, Juffer, and Van IJzendoorn (2002), for example by including the verbal interaction between mother and child in an age-appropriate way (for more detailed information, see Stams et al., 2002). In this study, the coders were trained on the use of these adapted scales by an expert coder¹. Average intraclass intercoder reliability for the scales was .92 (.91-.93, $n = 20$) for three coders. Principal components analyses pointed to one underlying factor, *Sensitive Parenting* (factor loadings $> .84$), and showed high internal consistency (alpha .88). The factor *Sensitive Parenting* is the summed score for the scales Supportive presence, Clarity of instruction, and Sensitivity and Timing in instruction, divided by three.

Peabody Picture Vocabulary Test

We administered the Peabody Picture Vocabulary Test - third edition (Dunn & Dunn, 1997), indicating the linguistic development of the children at 89 months. A validated Dutch translation was not available at the time the research took place, so a native speaker translated the scale items and a different native speaker translated the items back into English, to check for any difference. The child's score on the Peabody reflects the number of correctly identified pictures.

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Results

Descriptives

Means and standard deviations of the continuous scores for attachment representation and observed attachment are presented in Table 4.1. The distribution of attachment representations of the children was as follows: 23% (22 / 94) were classified as having an insecure-avoidant attachment representation, 62% (58 / 94) as having a secure attachment representation, and 15% (14 / 94) as having an insecure-bizarre/ambivalent attachment representation. The distribution of attachment measured by observation led to the following distribution: 24% (21 / 86) of the children were classified as insecure-avoidant, 58% (50 / 86) as secure, and 17% (15 / 86) as insecure-resistant. No significant associations between attachment security scores and any of the background variables were found (Table 4.2). Means and standard deviations of heart rate, heart rate variability, and electrodermal reactivity during the Attachment Story Completion Task are presented in Table 4.3.

Table 4.1 Overview of descriptive data

	18 Months		89 Months	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Attachment Representation			16.05	3.51
Attachment Observation	0.70	2.45	5.01	1.56
Sensitive Parenting			3.59	1.37
Age child (months)	17.94	0.80	88.98	5.86
Vocabulary			129.95	24.02
SES	3.91	1.70		

Note. N = 84 – 94.

Table 4.2 Bivariate associations of attachment representation and observation at 89 months, with sensitive parenting at 89 months and attachment at 18 months

	1	2	3	4	5	6
<i>89 months</i>						
1 Attachment Representation	-					
2 Attachment Observation	.04	-				
3 Sensitive Parenting	.01	.01	-			
<i>18 months</i>						
4 Attachment Observation	-.06	.21*	.12	-		
<i>Background variables</i>						
5 Age Child	.16	.08	-.03	-.11	-	
6 Vocabulary	.12	.08	.03	-.02	.28**	-
7 SES	.01	.07	-.08	-.10	.22**	-.03

Note. N = 84 – 94.

* $p < .10$. ** $p < .05$.

Table 4.3 Overview of descriptive physiological data during the Attachment Story Completion Task

	Overall (<i>n</i> = 74)				Secure Representation (<i>n</i> = 45)				Insecure Representation (<i>n</i> = 29)			
	Attachment		Control		Attachment		Control		Attachment		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
HR	93.23	9.95	92.61	10.12	92.44	10.60	91.87	10.84	94.46	8.88	93.76	8.95
HRV	52.83	29.62	53.53	29.77	56.11	29.90	56.08	30.04	47.75	28.95	49.57	29.43
EDA	11.62	3.92	11.63	3.85	12.06	4.14	12.03	4.12	10.94	3.51	11.01	3.37

Convergent Validity Attachment 89 months

No concurrent connection was found between attachment quality as measured by the representational measure and the observational measure, when the distinction was made between secure and insecure attachment, $\kappa = .08$, $p = .23$, one-tailed. The concordance of the children classified as secure was 66% (33 / 50), and of the children classified as insecure 42% (15 / 36). No significant concurrent association was found between the continuous security scores from the representational and the observational measure, $r(86) = .04$, $p = .37$, one-tailed (Table 4.2).

Stability of Attachment from 18 to 89 months

When the attachment quality measured with the representational measure at 89 months was used, no stability of attachment across 18 to 89 months was found when

the distinction was made between secure and insecure attachment (53%, $\kappa = .00$, $p = .48$, one-tailed). From 18 to 89 months, 62% of the children remained secure (37 / 60), and 38% insecure (13 / 34). Also, no stability was found for the continuous security scores for attachment from 18 to 89 months, $r(94) = -.06$, $p = .29$, one-tailed (Table 4.2).

When the attachment quality was measured using the observational measure at 89 months, the stability across almost six years was significant but modest when the distinction was made between secure, insecure-avoidant, and insecure-resistant (55%, $\kappa = .18$, $p < .05$, one-tailed). From 18 to 89 months, 65% of the children remained secure (36 / 55), 47% insecure-avoidant (8 / 17) and 21% insecure-resistant (3 / 14). When the distinction was made between secure and insecure attachment, the stability was 62% (53 / 86), $\kappa = .20$, $p = .03$, one-tailed. Secure attachment relationships tended to be more stable (65%) than insecure attachment (55%). The continuous security scores for attachment at 18 and 89 months also showed stability, $r(86) = .21$, $p = .03$, one-tailed (Table 4.2).

Construct Validity through Physiological Measures Attachment Representation at 89 months

For heart rate, no differences were found on the attachment related stories between children with a secure and children with an insecure attachment representation, $F(1, 72) = 0.72$, $p = .40$, and no differences were found on the control stories between children with a secure and children with an insecure attachment representation, $F(1, 72) = 0.61$, $p = .44$. A repeated measures analysis of variance with story (control or attachment) as within-subjects factor and with a three-way attachment representation (secure, insecure-avoidant, or insecure-bizarre/ambivalent) as between-subjects factor showed a significant effect of story, $F(1, 71) = 5.68$, $p < .05$, but no significant interaction between story and attachment representation, $F(2, 71) = 0.07$, $p = .94$ (see Figure 4.1). The mean heart rate was higher during the attachment stories than during the control stories. The same repeated measures analysis of variance with story (control or attachment) as within-subjects factor but with a two-way instead of three-way attachment representation (secure or insecure) as between-subjects factor, showed a significant effect of story, $F(1, 72) = 6.79$, $p < .05$, but no significant interaction between story and attachment representation, $F(1, 72) = 0.07$, $p = .80$. The mean heart rate was higher during the attachment stories than during the control stories (Table 4.3).

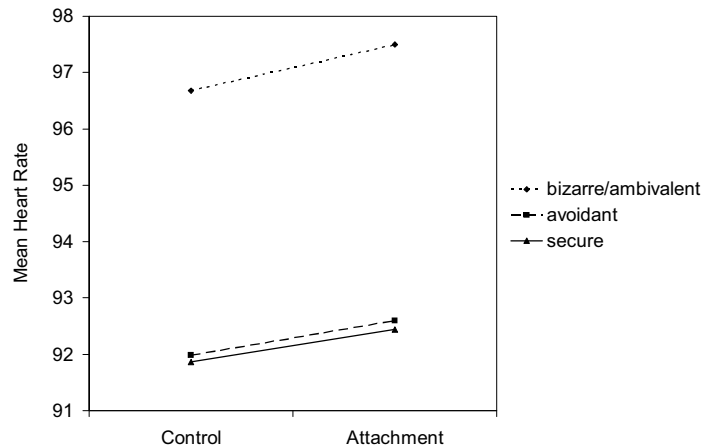


Figure 4.1 Mean heart rate during control stories and attachment-related stories for different attachment representations ($n = 74$)

For heart rate variability, no differences were found on the attachment related stories between children with a secure and children with an insecure attachment representation, $F(1, 72) = 1.41, p = .24$, and no differences were found on the control stories between children with a secure and children with an insecure attachment representation, $F(1, 72) = 0.84, p = .36$. A repeated measures analysis of variance with story (control or attachment) as within-subjects factor and a three-way attachment representation (secure, insecure-avoidant, or insecure-bizarre/ambivalent) as between-subjects factor showed no significant effect of story, $F(1, 71) = 3.49, p = .07$, and no significant interaction between story and attachment representation, $F(2, 71) = 1.45, p = .24$ (see Figure 4.2). The same repeated measures analysis of variance with story (control or attachment) as within-subjects factor, but with a two-way instead of three-way attachment representation (secure or insecure) as between-subjects factor also showed no significant effect of story, $F(1, 72) = 2.70, p = .11$, and no significant interaction between story and attachment representation, $F(1, 72) = 2.89, p = .09$ (Table 4.3).

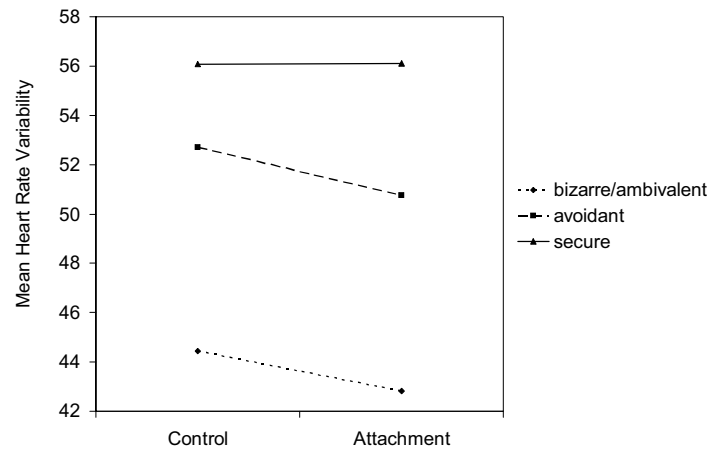


Figure 4.2 Mean heart rate variability during control stories and attachment-related stories for different attachment representations ($n = 74$)

For electrodermal activity, no differences were found on the attachment related stories between children with a secure and children with an insecure attachment representation, $F(1, 72) = 1.45, p = .23$, and no differences were found on the control stories between children with a secure and children with an insecure attachment representation, $F(1, 72) = 1.26, p = .27$. A repeated measures analysis of variance with story (control or attachment) as within-subjects factor and a three-way attachment representation (secure, insecure-avoidant, or insecure-bizarre/ambivalent) as between-subjects factor showed no significant effect of story, $F(1, 71) = 0.15, p = .70$, and no significant interaction between story and attachment representation, $F(2, 71) = 0.19, p = .83$ (see Figure 4.3). The same repeated measures analysis of variance with story (control or attachment) as within-subjects factor but with a two-way instead of three-way attachment representation (secure or insecure) as between-subjects factor showed no significant effect of story, $F(1, 72) = 0.06, p = .81$, and no significant interaction between story and attachment representation, $F(1, 72) = 0.38, p = .54$ (Table 4.3).

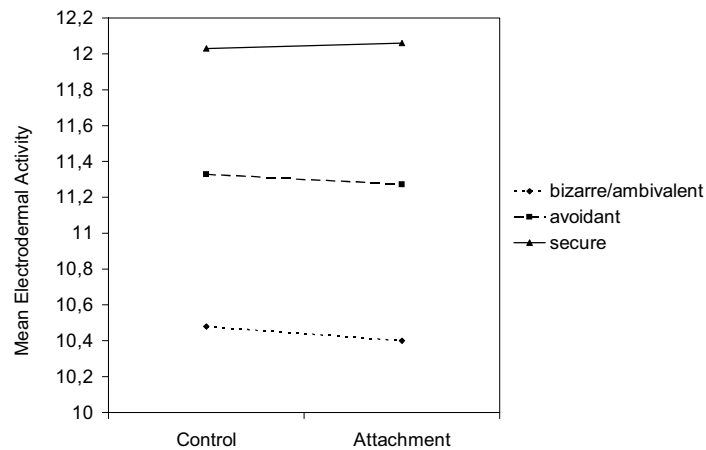


Figure 4.3 Mean electrodermal activity during control stories and attachment-related stories for different attachment representations ($n = 74$)

Core Theoretical Hypothesis on the Relation between Attachment and Sensitive Parenting at 89 months

No significant associations were found between ASCT attachment representation and observed attachment behavior on the one hand, and sensitive parenting on the other hand (Table 4.2).

Discussion

Our study examined the validity of the ASCT. We did not find any evidence for convergent validity between attachment quality as measured with the doll-play narrative and with concurrent observation of attachment behavior. Construct validity of the ASCT was partly supported by the fact that children did experience more stress during the attachment-related stories than during the control stories. However, we did not find any difference in electrodermal and heart rate responses between children with a secure and children with an insecure attachment representation. No stability between attachment assessed at 18 months with the Strange Situation Procedure and ASCT attachment representation at 89 month was found, in contrast to our expectation that attachment security may remain moderately stable over time (Fraley, 2002). No

evidence was found to support the expected positive relation between attachment security and sensitive parenting.

Our results showed no evidence for convergent validity of the ASCT. Attachment security concurrently assessed by the ASCT and a separation-reunion procedure lacked concordance. This finding is contrary to findings from research on other doll-play narratives (Bretherton et al., 1990; Solomon et al., 1995). In these studies, overall agreement between the doll-play classifications and the classifications based on reunion behavior was high and varied between 75% (secure vs. insecure, *kappa* significant, but no exact statistic given; Bretherton et al., 1990) and 79% (4-way distinction of attachment, *kappa* = .74; Solomon et al., 1995). In our study, the overall agreement was only 56% (secure vs. insecure, *kappa* = .08). Our sample with somewhat older children may partly explain the diverging findings. Although the children in our sample did experience more stress during the attachment-related stories, the attachment system may not be activated to the same degree in our sample with children with a mean age of 89 months as in the samples included in previous research with children with a mean age between 37 and 71 months. In younger children who find it more difficult to distinguish between reality and fantasy, the attachment system may be more readily activated by the scenarios of the doll stories, e.g. the thought of a monster in their bedroom may be experienced as a real fear. For older children, this thought may not be so frightening anymore and thus it could be less effective in activating the attachment system (Solomon & George, 1999). If this is the case, the discrepancy in the degree to which the attachment system is activated during the doll-play narrative and during the observation might lead to different attachment classifications and thus to a lack of convergent validity. More research is needed to further address this issue.

This possible divergence in activation of the attachment system in these older children may also account for the somewhat low internal consistency of the ASCT we found in our study. Whereas other studies using the ASCT mentioned an internal consistency of .68 for mother-child attachment representation and .71 for father-child attachment representation (Verschueren & Marcoen, 1999; Verschueren et al., 1996), the internal consistency in our study was only .48. Perhaps not every story of the ASCT activates the attachment system to the same degree, thus reducing the internal consistency of the test. It should be noted that the coding of the attachment stories does not account for the difference in internal consistency, because the training of the coders was based on stories previously coded by Verschueren. Intercoder reliability on attachment category as well as on the continuous attachment security scores was high.

To our knowledge, no prior research has used physiological data during doll-play narratives to assess its construct validity. We found no initial differences between the physiological reactions of the children with secure and insecure attachment representations, either for the attachment-related stories or for the control stories. When comparing the physiological reactions of the children to the attachment-related stories with their reactions to the control stories, the mean heart rate during the attachment-related stories was elevated. Thus, children did find the attachment-related stories more stressful than the control stories, supporting the construct validity of the ASCT. Unfortunately, we did not find the expected difference in physiological reactivity between children with secure and children with insecure attachment representations on the attachment-related *versus* control stories. It should be kept in mind, however, that previous research on physiological stress responses in the Strange Situation Procedure also yielded equivocal evidence for differences in stress reactivity between attachment groups. For example, Spangler and Grossmann (1993) did not find any differences between securely and insecurely attached infants in heart rate change during the reunion episodes of the Strange Situation, whereas Sroufe and Waters (1977) did.

Contrary to our expectation, we did not find any stability between attachment security at 18 months and attachment representation at 89 months. Also, the continuous scores for attachment in infancy and attachment representation in middle childhood revealed no association. These findings contrast with the two prior longitudinal studies using the Strange Situation Procedure in infancy, but different measures of representation in middle childhood (Attachment Story Completion Task in Bretherton et al., 1990; Story Completion Procedure in Doll Play in Gloger-Tippelt et al., 2002). Researchers using other doll-play narratives in middle childhood often refer to these longitudinal studies to support the validity of their own representational measures (cf Verschueren & Marcoen, 1999). Our results show that different doll-play narratives should be treated differently before demonstrated otherwise, and that validity should be established for every single representational measure separately. We did, however, find a significant, but modest, stability between the observed attachment security at 18 and 89 months. This result, although somewhat lower, is in line with meta-analytic results (Fraleay, 2002).

We found no association between attachment security measured with the ASCT and concurrently observed sensitive parenting. Again, this outcome is not in line with previous research on the relation between attachment representations as assessed with doll-play narratives and sensitive parenting, although pertinent studies are scarce,

and only parental self-report measures for sensitive parenting were used (Stevenson-Hinde & Verschueren, 2002). The relation between attachment representation and sensitive parenting may be influenced by the possible moderating effect of child characteristics, and/or the positive attachment relationships formed with other people (Verschueren & Marcoen, 1999; Stevenson-Hinde & Verschueren, 2002). This might account for the lack of association found in our study.

Our study involved only girls. Although previous studies using the ASCT did not reveal any gender differences (Verschueren & Marcoen, 1999; Verschueren et al., 1996), we focused on girls because it allowed for more powerful conclusions than an equally large sample with girls and boys. However, this gender bias does limit the generalizability of our findings, as does the fact that we used predominantly middle-class and upper middle-class families. The homogeneity of the sample may be one of the reasons that variance in central variables remained relatively small, and that it was, therefore, more difficult to find associations. However, in our sample we found a standard deviation of 3.51 for the continuous ASCT scores (with a mean of 16.05) which is about the same as the standard deviation (and mean) found by Verschueren and Marcoen (1999). In addition, our study sample size may have been too small to detect modest associations. It should be noted however that our sample size was not much smaller than the sample of Verschueren and Marcoen (1999), and larger than the sample of Verschueren et al. (1996). Furthermore, a power analysis with an expected modest effect size of $r = .30$ and a sample size of $N = 86$ yielded a power of .82, which should be considered satisfactory (Cohen, 1988). To be able to detect smaller associations, a larger sample is needed.

In sum, the present findings did not support the convergent validity of the ASCT. Construct validity was only partly supported. No evidence was found for the hypotheses that attachment security remains stable over time, and that there would be a positive association with sensitive parenting. These results are not encouraging for the use of the ASCT in middle childhood. Future research should consider the appropriateness of the different stories in activating the attachment system at different ages. Furthermore, these issues of validity for different samples should be addressed in order to generate a much-needed well-validated measure of attachment representation in middle childhood.

